

viously. Among such compounds may be mentioned the pyromucates, propionates, citrates, tungstates, m-nitrobenzoates, camphorates, phenyloxyacetates, diphenylsulfonates, and the bromo-nitrobenzene-sulfonates. He prepared a general scheme of separation for the entire group and as he succeeded in making refinements from time to time, this scheme was revised and improved.

Professor James recognized the desirability of introducing more exact methods into rare-earth work and accordingly he devoted considerable time to the adaptation of analytical procedures to this field. Realizing the need of more accurate scientific information he determined the solubilities of many of the rare-earth salts under various circumstances, and his study of the solubility of the rare-earth bromates is the most complete record in existence. These details have been of untold value in promoting skillful rare-earth work. He has made extensive studies upon the problem of the quantitative determination of the individual members of the rare-earth group. This is an extremely difficult task because of the similarity of the members of this group, their close resemblance to several of the neighboring elements and the marked tendency of their precipitates to occlude various materials from solution. In spite of such handicaps successful methods were devised and many have become standard practice where such work is required. We are indebted to the James laboratory for methods for the quantitative determination of yttrium, lanthanum, neodymium, and cerium; he likewise pointed out some of the errors which were unavoidable in the older methods.

Few problems in the whole field of chemistry require greater skill and care in every minute detail than is needed in the determination of atomic weights. Such work in the rare-earth group is doubly difficult because of the tremendous task which is imposed by the difficulty in preparing material of atomic weight purity. Professor James and his coworkers were particularly successful in this field because of the skill developed in handling rare-earth material. His determinations include the value of thulium, samarium, and yttrium. It is very significant to observe that the values which he found are almost exactly those which are now accepted by the International Committee.

When Professor James began his work upon the rare-earth group there was much confusion concerning the number of elements which should be included as well as in their relationship to one another. Some of the elements were regarded as existing in a meta form and thulium was said to consist of a mixture of thulium I, thulium II, thulium III. The James laboratory made a special and exhaustive

study of the behavior of thulium and finally succeeded in establishing the fact that thulium is a definite chemical individual and that there is no reason for believing it to be other than a single element. Much confusion also prevailed concerning the elements of high atomic weight. Professor James applied himself with his characteristic zeal to the study of this portion of the group and it has been reported that in his laboratory he had succeeded in separating the compounds of lutecium before the discovery of this element was reported from a European laboratory. With his characteristic thoroughness he had waited for a confirmation of his first results, so the honor of this discovery went elsewhere. In a closely similar situation Professor James had long been interested in the presence of element No. 61, which had been predicted years before the work of Moseley. Careful search through many years had failed to reveal any indication of the presence of this element. But at last he had succeeded in effecting a partial separation, but while his material was being subjected to X-ray analysis at the University of Michigan the announcement of this discovery of element No. 61 was made from another laboratory. This fact, however, must not be interpreted as detracting from the credit due to Professor James, because his work in that field was performed with the utmost care and it must stand as representing the unusual skill and careful scientific precaution which so thoroughly characterized his work.

It must not be assumed that Professor James had no interest outside the rare-earth group. His interest extended to a study of many related elements and in this work his rare-earth experience made his investigations particularly valuable. He devised a new method of separating thorium, a separation which is of much practical value because commercial thorium is separated from rare-earth ores. He also was much interested in zirconium and its separation from the members of the rare-earth group. His phenyl-arsonic acid method for the estimation of zirconium and thorium mark a great step in advance in the chemistry of these elements. Zirconium especially has long needed a definite and conclusive method for its detection and estimation. The new interest in zirconium which is reflected from hafnium and the fact that we now have definite means for its quantitative determination will undoubtedly lead to material advancement in the chemistry of this much-neglected element. In addition, Professor James made outstanding contributions to the chemistry of scandium, gallium, germanium, and beryllium.

In his later years Professor James had become interested in the rare-earth and kindred metals. He prepared in his laboratory many of the

metals and he was keenly interested in the possibilities of their commercial utilization. His work upon uranium is outstanding in its excellence and is typical of the work which he did. Although little has been published concerning his work along these lines he has built a permanent foundation upon which posterity may be expected to erect a monument of achievement which will be a fitting tribute to his memory.

Professor James was a prolific worker whose contributions to chemistry are both numerous and valuable. But no doubt the greatest professional contribution of his life was his quiet and kindly influence over the lives of his students. A list of publications reveals the fact that he has been instrumental in the training of many chemists whose names stand high in chemical circles. To train such men is to make a contribution whose influence is eternal.

BOTANY.—*Studies in Solanaceae*.—I. *The species of Cestrum collected in Venezuela up to 1930*.¹ H. PITTIER, Caracas, Venezuela.

A few years ago I had undertaken the study of the Solanaceae of my Venezuelan collection, but, having been given the hope that the eminent monographer Dr. Bitter would soon revise the whole family, with inclusion of our materials and in a far more authoritative way, I gave up the matter. Dr. Bitter named and described several *Solana* and a few species belonging to other genera, exclusive of *Cestrum*. Now that death has unfortunately brought to an untimely end the work of the able German scientist, I have taken up again the examination of the Venezuelan species of the latter group, with the results given in continuation.

It will be seen that 8 species, that is to say, over one-third of the total number reported, could not be identified with any previously known and had to be described as new. Of these only two, *Cestrum Diasae* and *C. amplum*, proceed from the cold upper belt of the Andes and constitute interesting additions to the group of small, stiff-leaved species which includes besides *C. melanochloranthum*, *C. Lindeni* and *C. Miersianum*, all belonging to our flora and also characterized by their more or less violaceous flowers. Four more species, *C. dubium*, *C. calycosum*, *C. caloneurum*, and *C. bigibbosum* were collected in the cloud-forests of Galipan and Colonia Tovar, in the Coastal Range, where conditions seem to greatly favor endemism. Finally, of the two remaining species one, *C. grande*, which reaches the

¹ Received November 15, 1931.

dimensions of a real tree, belongs to the *tierra caliente* and to the littoral belt, while the other, *C. meridanum*, grows in the hills of the *tierra templada* of Mérida. Far as I am from sources and materials for comparison, I am aware that some of the proposed new species may possibly have been described in recent times.

One species (*Pittier 5797*) collected at Maracay (Aragua) in 1913 and of which there is a specimen in the U. S. National Herbarium but none in our collection, was identified as *Cestrum nocturnum* L. This is certainly wrong, since that species appears to be essentially West Indian and Central American. Of the older species, I have collected only *C. diurnum* (in gardens), *C. alternifolium*, *C. melanochloranthum*, *C. salicifolium*, *C. paniculatum*, *C. Moritzi*, and *C. Miersianum*. *C. macrophyllum* has been reported from the Lower Orinoco by Rusby and Squires. *C. tinctorium*, *C. potaliaefolium*, *C. tenuiflorum*, *C. laxiflorum* and *C. Lindeni* are known only from the type collections.

It is likely, since so small a part of Venezuela has been covered as yet and there are strong indications of the existence of a certain degree of endemism, that many more species remain to be discovered. From Trinidad *C. megalophyllum*, *C. latifolium* (= *C. chloranthum*) and *C. subtriflorum*, all first described by Dunal, have been reported, some of which may be found on the neighboring coast of Tierra Firme. Meanwhile, the twenty-two species known to this date are grouped according to their characters in the following key:

Filamenta laevia

Flores in apicibus ramulorum vel in axillis foliorum congesti

Folia 2.5 cm. fere semper breviora, glabra; flores violacei, 1.5–1.9 cm. longi—Crescit in Andinum frigidis *C. melanochloranthum*

Folia 3 cm. longa vel longiora—In calidis

Corolla nivea, 9–11 mm. longa, lobulis suborbicularibus, glabris, revolutis; antherae violaceae; stigma manifeste exsertum; folia glaberrima—Culta *C. diurnum*

Corolla flavo-virescens vel purpurascens, 1.5–2.5 cm. longa, lobulis linearibus, marginibus intraflexis pubescentibus; antherae flavae; stigma inclusum; folia plus minusve pubescenti *C. alternifolium*

Flores in racemis simplicibus, paucifloribus, axillaribus terminalibusve dispositi

Corollae tubus plus minusve cylindricus, basi 1 mm. lata vel latior, apice versus plus minusve ampliatus

Venae primariae 6–12

Folia ovalia, subtus stellato-tomentosa, 4.5 cm. longa vel breviora; corollae tubus 10 mm. longus *C. Diasae*

Folia utrinque glabra

Flores 1.4 cm. longi vel breviores; folia usque ad 8 cm. longa,
2.6 cm. lata *C. tinctorium*

Flores 1.5 cm. longi vel longiores; folia 8 cm. plerumque longiora

Corollae tubus 15–16 mm. longus; folia membranacea, obovato-
lanceolata, 18–25 cm. longa, 6–9 cm. lata *C. potaliaefolium*

Corollae tubus 12–13 mm. longus; folia coriacea, oblongo-
elliptica, 8–13 cm. longa, 3–4 cm. lata *C. dubium*

Venae primariae 16–20; folia glabra

Folia lanceolata, 9–13 cm. longa, 1–2.5 cm. lata; inflorescentia
glabra; flores 2.5 cm. longi *C. salicifolium*

Folia 4 cm. lata vel latiora; inflorescentia plus minusve cano-
furfurescens; flores pro genere brevi crassique

Calyx 10 mm. longus; corolla 1.5–2 cm. longa; folia coriacea,
elliptico-lanceolata *C. caloneurum*

Calyx 11.5–12.5 mm. longus; corolla 2.2 cm. longa; folia mem-
branacea; ovato-lanceolata *C. calycosum*

Corollae tubus filiformis, basi quam 1 mm. diameter angustior

Venae primariae 18–19; calyx brevissimus, 3–4 mm. longus; folia
membranacea, glaberrima, ovato-lanceolata, basi rotundata apice
versus sensim attenuata *C. grande*

Venae primariae 6–9

Caules volubiles vel scandentes

Inflorescentiae terminales et axillares, anguste paniculatis; corolla
2.7 cm. longa; petioli recti *C. paniculatum*

Inflorescentiae plerumque axillares, racemosae, latae, laxae;
corolla 3.8 cm. longa; petioli basi uncinato-incurvi *C. terminale*

Caules plus minusve erecti, suffrutescentes vel lignosi

Folia ovato-acuminata, 10–11 cm. longa, nervis subtus plus
minusve tomentosis; flores 1.9–2.1 cm. longi, in spicis axillaribus
dispositi *C. tenuiflorum*

Folia ovato-elliptica, 7.5–9.5 cm. longa, glabra glabrescentes;
flores 2.3–2.8 cm. longi, in paniculis terminalibus dispositi

C. laxiflorum

Filamenta circa basi partis liberae plus minusve glandulosa, dentulata vel
geniculata

Flores in racemis axillaribus, 3–6.5 cm. longis dispositi; folia 11.5–2 cm.
longa, subtus stellato-lanuginosa; corolla subglabra, 1.0–1.5 cm. longa

C. Moritzi

Flores paniculati

Staminum filamenta infra emersionem sua dentato-appendiculata;
panicula ampla, floribunda *C. nocturnum*

Staminum filamenta supra emersionem sua glandulosa, dentata vel
geniculata

Panicula simplex, spiciformis et pauciflora; filamenta supra basin bigibbosa; folia magna, lanceolata, glabra, 15–28 cm. longa

C. bigibbosum

Panicula plus minusve composita; folia mediocria vel parva; glandula basalis filamentorum singula vel obsoleta

Rami paniculae folia subaequant; flores numerosissimi, violacei; folia coriacea, glabra

C. amplum

Rami paniculae folia multo breviora

Folia 10 cm. longa vel longiores, glabra

Calyx 2.6 mm. longus; corollae plus minusve flavescens 8–15 mm. longa; folia ovato-oblonga

C. macrophyllum

Calyx 3.7–4.5 mm. longus; corolla violacea, 17 mm. longa; folia oblongo-lanceolata

C. Lindenii

Folia 9 cm. longa vel breviora, ovales, stellato-villosis

Flores tenui, pedicellati, viridi-flavescentes, 1.5–1.7 cm. longi

C. meridanum

Flores crassi, sessiles, flavo-violacei, 2 cm. longi

C. Miersianum

CESTRUM MELANOCHLORANTHUM Dunal in DC. Prodr. 13¹: 622. 1852.
(Descr. emend.)

Arbuscula e basi ramosa, ramis virgatis, cortice rimosulo, sordide griseo, minutissime puberulo tectis, ramulis tenuibus apice versus angulosis parce pilosulis, pilis rufo-brunneis interdum glandulosis; foliis parvis, coriaceis, utrinque glabris, breviter petiolatis, petiolo plano plus minusve rufo-brunneo, laminis oblongo-ellipticis basi cuneato-attenuatis in petiolum decurrentibus apice obtusiusculis, supra obscure viridis subtus pallidioribus venis primariis plerumque 5–7 costaque prominulis; pseudo-stipulis parvis, foliaceis, ovato-oblongis, obtusis, deciduis; floribus axillaribus subsessilibus in apicibus ramorum subcongestis; bracteis minutis, linearibus, minute pilosulis, deciduis; pedicellis brevissimis vel nullis, rufopilosulis; calyce tubuloso-cupulato, striato, 5-nervio, atro-viridi, apice plus minusve spuberulo, sinibus ampliis, dentibus inaequantibus; corolla infundibuliformi, atro-purpurea, tubo e basi ad apicem sensim ampliato, striato, glabro, lobulis ovato-ellipticis, extus vix minutissime puberulis floccosisve, intus marginibusque introflexis fulvis pubescentibus; filamentis glabris, edentulis, fere usque ad medium adnatis, supra basin leviter inflatis; antheris luteis, orbiculari-ellipticis; stylo filiformi, glabro; stigmatibus capitato, globoso; bacca ovoidea, violacea.

Arbuscula 1–1.2 metralis. Petioli 1–3.5 mm. longi; laminae 1–3 cm. longae, 0.5–1.8 cm. latae, Stipulae 0.5–1 cm. longae. Bractee 2–4 mm. longae. Flores 1.5–1.9 cm. longi. Pedicelli 0–0.3 mm. longi. Calyx 2–4 mm. longus, ore 2 mm. diam. Corolla 1.3–1.7 cm. longa, lobulis 3.5–3.7 mm. longis. Stamina pars libera circa 8 mm. longa. Stylus 1.4 cm. longus. Bacca 6 mm. longa, 4.8 mm. diam.

MÉRIDA: Near El Portachuelo de Mucuchíes (*Funck & Schlim* 1264 in herb. D.C., type); Páramo de El Molino, 3000 m.; flowers January 22, 1922 (*A. Jahn* 923); San Rafael de Mucuchíes, 3150 m.; flowers January 21, 1922 (*A. Jahn* 811); same locality, in low bushes along river; flowers February 6, 1928 (*Pittier* 12911); same locality, along Quebrada de Saysay; flowers

June 25, 1930 (*Gehriger* 40), Mucurubá, 2700-3000 m.; flowers and fruits
 June 25, 1930 (*Gehriger* 255).

Notwithstanding small discrepancies, as in the dimensions of the several parts, the number of primary veins, etc., I think that the specimens examined by me are conspecific with the plant of Funck & Schlim.

CESTRUM DIURNUM L. Sp. Pl. 1: 191. 1753.

This fine species, which seems to be indigenous in some of the West Indian Islands, is known in Venezuela only as an ornamental, under the name of *Dama de noche* (Lady of night), a mistaken denomination since the sweet-scented flowers are permanently perfumed, though perhaps less during the day. The plant is distinguished from all its Venezuelan congeners by its pure white corollas and the exerted stigmas.

CESTRUM ALTERNIFOLIUM (Jacq.) O. E. Schulz in Urban, Symb. Antill.
 6: 270. 1909-1910.

Cestrum vespertinum L. Mant. 2: 206. 1771.

We have in the Venezuelan herbarium no less than five distinct collections proceeding from several districts of the warm and temperate belts, which evidently should be included under this name. But, though very much alike in their appearance, the shape and indumentation of the leaves, etc. they show the greatest disparity in the dimensions of the several parts of the flowers. We give here the extreme results of the dissections made:

Calyx 2.6-4.5 mm. Corolla 15.5-30.5 mm., the lobules 4-6.5 mm. long.
 Stamens 14-23 mm., the free part of the filaments 0.5-2.3 mm.

As these lengths are in no way correlative, there is hardly a possibility of establishing on them well defined varieties. The collections of Saer nos. 15 and 184 may correspond to the var. *pendulinum* (Jacq.) O. E. Schulz, while this last author attributes the specimens collected by Johnston at El Valle, Margarita Island, to his var. *mitanthum*.

Cestrum Diasae Pittier, sp. nov.

Arbuscula e basi multiramea, ramis virgatis, teretibus, ramulisque brevibus villosa-tomentosa sparsissime glandulosa; foliis parvis coriaceis breviter petiolatis, petiolo marginato marginibus tomentosa, laminis ovalibus basi cuneatis in petiolo decurrentibus apice subobtusis subacutisve supra lucidis solute viridis plus minusve asperulo-villosulis venis primariis plerumque 7 impressis, subtus pallidioribus stellulato-tomentosa costa venisque prominentibus; pseudo-stipulis foliaceis, parvis; inflorescentia ramosa, floribunda; floribus in axillis spicatis, parvis, sessilibus vel breviter pedicellatis; bracteis parvis, obovato-oblongis, villosis, caducis; calyce infundibuliformi, 5-nerve, extus glanduloso-villoso, dentibus brevibus triangularibus apice subacutis penicillatis; corolla brevi, tubo infundibuliformi, extus glabro violaceo-flavescente, lobulis ovalibus imbricatis, extus atro-violaceis minutissime pubescentibus, marginibus introflexis, pallidioribus, minute tomentosa; staminibus tubo ad medio adnatis, filamentis laevibus, antheris ovato-cordatis, obtusis, glabris; ovario glabro, stylo laevi, stigmatate, capitellato.

Arbuscula circa 1 m. alta. Petiolus 4–7 mm. longus; lamina 3.5–4.5 cm. longa, plus minusve 2 cm. lata. Pseudo-stipulae cum petiolo 1–1.5 mm. longo, circa 1 cm. longae, 0.5 cm. latae. Ramuli floriferi 3.5–10 cm. longi. Flores 12.2 mm. longi. Calyx 4–5 mm. longus, dentibus 0.5–0.8 mm. longis. Corollae tubus 9.9 mm. longus, lobuli 2.3 mm. longi. . Staminum pars libera plus minusve 5 mm. longa. Pistillum circa 1 cm. longum.

MÉRIDA: Misintá above Mucuchíes (3500 m.) on dry slopes; flowers Feb. 5, 1928 (*Pittier* 12919, type).

This species does not seem to have close affinities with any of those reported from the upper belt of the Andes. I have named it in honor of my diligent assistant, Miss Margot Díaz, who has cleverly prepared all the dissections related to the Venezuelan species of *Cestrum* in our herbarium.

CESTRUM TINCTORIUM Jacq. Hort. Schoenbr. 3: 45, t. 332. 1798.

The type of this species, which we have not seen, is from Caracas, where it was collected either by Jacquin himself or by Bredemeyer. Schulz considers it as a simple variety of *C. diurnum*, identical with his var. *venenatum* (Mill.). The characters given for the corolla in the original description, however, do not seem to favor this view. Besides, since *C. diurnum* does not exist in wild condition in Venezuela, it is unlikely that one of its varieties could have been collected near Caracas.

CESTRUM POTALIAEFOLIUM Dunal in DC. Prodr. 13¹: 638. 1852.

Collected somewhere in the Andes by Moritz (no. 824, type), this imperfectly known shrub does not seem to have been seen again. The quotation *Colombia*, in the Prodrum, is inaccurate, Moritz not having reached that country in his travels.

Cestrum dubium Pittier, sp. nov.

Arbor parva (E. Pittier), ramis flexuosis, glabris, parte defoliata cicatriculis foliorum delapsorum dense oblecta, juveniis angulosis, irregulariter sulcatis; foliis coriaceis, petiolatis, exstipulatis, glaberrimis, petiolo canaliculato, laminis oblongo-ellipticis, basi cuneatis, apice acutis, supra obscure viridis, costa venisque primariis 9–12 impressis, subtus pallidioribus, costa venisque prominentibus; inflorescentia terminali, pauciflora, spicis subcincinnatis; floribus purpureis, ebracteatis, pedicellatis, interdum (terminalibus) sessilibus; calyce tubuloso, tubo striato, glabro, dentibus irregularibus, triangularibus, apice puberulis; corolla infundibuliformi, glaberrima, lobulis oblongis, apice obtusiuseculis, marginibus introflexis; staminibus ad medium tubo adnatis; filamentis laevibus, basi leviter incrassati; ovario styloque glabro.

Petioli 0.6–1 cm. longi; laminae 8–13 cm. longae, 2.8–4.1 cm. latae. Inflorescentia 7 cm. longa. Flores circa 18 mm. longi. Pedicelli 0–5 mm. longi. Calyx circa 5 mm. longus. Corolla circa 17 mm. longa, lobulis 5–6 mm. longis.

FEDERAL DISTRICT: Forests around Los Venados de Galipan, 1500–1800 m., above Caracas; flowers Oct. 25, 1921 (*Emilio H. Pittier* 166, type).

The only specimen at hand is very deficient and had a single complete

flower. It evidently should be placed near *C. potaliaefolium* from which it is distinguished by the smaller, coriaceous leaves and the larger flowers.

CESTRUM SALICIFOLIUM Jacq. Hort. Schoenbr. 3: 42, t. 326. 1798.

Type from the vicinity of Caracas, where it was collected again by Humboldt and Bonpland. Our single specimen is from the State Miranda, where Allart found it at Quebrada de las Comadres, near Las Mostazas, 1100 m., at the headwaters of the Guayas River. In the main, our plant agrees with the descriptions.

***Cestrum caloneurum* Pittier sp. nov.**

Arbor parva, ramis ramulisque virgatis, apice plus minusve pulverulentopubescentibus; foliis coriaceis, glaberrimis, petiolatis, pseudo-stipulis munitis; petiolo pro genere longo, canaliculato, costaque nigrescente; laminis elliptico-lanceolatis, basi longe cuneatis, apice sensim acuminatis acutissimis, supra nigrescentibus costa impressa venis primariis circa 20 venulisque prominulis, subtus pallidioribus costa venisque prominentibus venulis prominulis; marginibus minute revolutis; pseudo-stipulis falcatis, glabris, persistentibus; floribus pedicellatis, bracteolatis, in panicula composita dispositis; cincinnis axillaribus, paucifloribus, rhachi dense cano-tomentello; pedicellis brevibus, interdum subnullis; bracteolis subulatis, caducis; calyce tubuloso-cupulato, tubo basi cano-puberulo, dentibus parvis, irregularibus, acutis, intus fulvo-pubescentibus, marginibus ciliatis; corolla virescente, tubo infundibuliformi, glabro, lobulis ovato-lanceolatis, obtusiusculis, marginibus introflexis, parce tomentellis; staminibus ad 1/2 tubo adnatis, filamentis basi leviter incrassata, interdum parvissime minutissimeque pilosulis; antheris subglobosis; stylo glabro, stigmatibus discoideis.

Arbor 2-4 m. alta. Petioli 1.2-2.5 cm. longi; laminae 7.5-18 cm. longae, 3-6 cm. latae. Pseudo-stipulae 0.5-1.2 cm. longae. Panicula ad 15 cm. longa; cincinni 2.5-7 cm. longi. Flores circa 2.2 cm. longi. Pedicelli 0-3 mm. longi. Calyx 10 mm. longus. Corollae tubus circa 1.7 mm. longus; lobuli 3.5 mm. longi. Filamenta 6.5-7 mm. longa. Stylus circa 13.5 mm. longus.

ARAGUA: Colonia Tovar, 1800-1900 m., in cloud-forests; flowers December 28, 1921 (*Pittier* 10045, type).

This species forms with *Cestrum calycosum* a group characterized by the larger dimensions of the calyx as compared with the corolla. Also both are small trees, inhabiting the high forests of the coastal range of Venezuela. But they differ entirely in the size, shape and consistence of the leaves which, besides, are exstipulate in *C. calycosum* and provided with characteristic pseudo-stipules in *C. caloneurum*.

***Cestrum calycosum* Pittier, sp. nov.**

Arbor parva ramis ramulisque flexuosis, glabris, lentiginosis; foliis magnis, glabris, membranaceis, longe petiolatis, exstipulatis, petiolis canaliculatis, laminis oblongo-ellipticis, utrinque attenuatis, basi cuneatis, apice acutissime breviterque acuminatis, supra laete viridibus, subtus parum pallidioribus, costa venisque primariis circa 18 tenuibus prominentibus; inflorescentia terminali, pauciflora, rhachi tomentello-puberulo; floribus sessilibus pedi-

cellatisve, bracteolatis, bracteolis lineari-subulatis brevibus, caducissimis; calyce tubuloso, irregulariter 4-5 dentato, extus parce tomentello-puberulo, intus minutissime pubescenti; corolla ampla, tubo glabro, lobulis erectis, oblongo-obtusis, marginibus introflexis; tomentellis; staminibus ad $1/2$ tubo adnatis, filamentis laevibus, basi minutissime pilosulis, antheris orbicularibus; ovario ad apicem minutissime puberulo, stylo glabro, stigmate discoideo, atro-purpureo.

Arbor 2-3-metralis. Petiolus 2-3 cm. longus; laminae 13-22 cm. longae, 5.5-8 cm. latae. Pedicelli 0-12 mm. longi. Bracteolae 1-2 mm. longae. Calyx 11.5-12.5 mm. longus, 2.5-3.5 mm. diam. Corolla circa 22 mm. longa, lobulis 4-5 mm. longis. Filamentorum pars libera circa 6 mm. longa. Stylus circa 13 mm. longus.

ARAGUA: Colonia Tovar, 1800-2000 m., in cloud-forests; flowers December, 1924 (*Allart* 480, type).

Cestrum grande [Pittier, sp. nov.]

Arbor pro genere elata, ramulis tenuibus, glabratis, purpurascens; foliis membranaceis, glaberrimis, petiolatis, exstipulatis, petiolo tenui, in sicco nigrescenti, laminis ovato-lanceolatis basi rotundatis, saepe inaequalibus, apicem versus sensim attenuato-acutatis, supra solute viridis costa venisque primariis 18-19 impressis, subtus vix pallidioribus costa venisque prominentibus, venulis tenuibus reticulatis; floribus pedicellatis, albo-virescentibus, tenuibus, in cymis axillaribus 2-8-floribus saepe geminatis dispositis, rhachi gracili pedicellisque cano-pubescentibus; pedicellis filiformibus, calyce longioribus; bracteolis subulatis, calyce longioribus, pilosulis, caducissimis; calyce tubuloso apicem versus leviter ampliato, glabrescente; corolla parva, tubo tenui apicem versus parum ampliato, glabro, lobulis oblongis obtusiusculis, marginibus leviter introflexis, tomentellis; staminibus usque ad tubi apicem adnatis, filamentorum parte libera laevi, glabra; antheris globosis; pistillo glabro; stigmate clavato; bacca globosa, glabra, calyce accrescente, cupulato, profunde lobulato suffulta; bacca immatura parva, globosa, calyce persistente suffulta.

Arbor 3-8-metralis. Petioli 0.8-1.1 cm. longi; laminae 13-15 cm. longae, 3.5-4.5 cm. latae. Cymae 2-2.5 cm. longae. Pedicelli 3-4 mm. longae. Bracteolae 2-4 mm. longae. Flores circa 1.5 cm. longi. Calyx 3-4 mm. longus. Corollae tubus 9-10 mm. longus; lobuli 0.3 mm. logi. Staminum filamenta circa 3 mm. longa. Pistillum 12 mm. longum. Bacca 4-5 mm. diam.

FEDERAL DISTRICT: Curucutí, 400 m., on old road from Caracas to La Guaira, in low, cool forest; flowers and fruits June 22, 1922 (*Pittier* 10393).

This species is distinguished from all the Venezuelan ones known to date, by its leaves, broadly rounded at the base and beautifully lanceate, its very small flowers and the globose berries.

CESTRUM PANICULATUM H.B.K. Nov. Gen. & Sp. 3: 62. 1818.

The type was collected in the vicinity of Caracas by Humboldt & Bonpland. We assume that *Saer* no. 162, obtained from Macuto near Barquisimeto, State Lara, belongs to this species. It differs from the following, *C. terminale*, in the shape, consistence and size of the leaves, which are also closer and with straight petioles, in the inflorescences, lax and broad rather than elongated, with a distinct arrangement of the much longer flowers.

Cestrum terminale (Dunal) Pittier

C. scandens var. *terminale* Dunal in DC. Prodr. 13¹: 665. 1852.

Scandente, sarmentosum, subvolubile, ramis ramulisque glabris; foliis membranaceis, petiolatis, glabris, petiolo crasso, canaliculato, basi uncinato, incurvato, laminis ovalibus ovato-oblongisve, basi rotundatis interdum leviter emarginatis in petiolo attenuatis, supra solute viridis costa impressa venis primariis 6-7 prominulis, subtus pallidioribus, obscure reticulatis costa prominente, venis primariis prominulis; racemis axillaribus foliis brevioribus, terminalibus multo longioribus, saepe depauperatis, foliosis, rhachi gracili plus minusve puberulo; floribus pedicellatis; pedicellis filiformibus apice bracteolatis; bracteolis lineari-lanceolatis, puberulis, caducissimis; calyce campanulato, 5-nervo, dentibus parvis, acutis, puberulis; corolla albivirescente extus glabra, tubo filiforme, apice ampliato, lobulis lanceolato-acutis, marginibus introflexis, puberulis; filamentorum parte libera brevissima, laevia, antheris ovoideis; ovario glabro, subgloboso, stylo filiformi, stigmatate obtuso, apice papilloso, albedo; bacca elliptica, obtusa, calyce persistente suffulta.

Petiolus 4-6.5 mm. longus; laminae 4-12.5 cm. longae, 3.5-7 cm. latae. Racemi axillares 5-12 cm., terminales usque ad 20 cm. longi. Pedicelli 3-8.5 mm. longi. Bracteolae 2-5 mm. longae. Calyx circa 4 mm. longus. Corolla 2-2.8 mm. longa, tubo 1.5-2.1 mm. longo, lobulis 5.5-6 mm. longis. Filamenta 0.5-0.7 mm. longa. Stylus 1.5-2 cm. longus. Bacca 7.5-8.5 mm. longa, 4-5 mm. diam.

Type from Santa Marta, Colombia, collected by Bertero (in herb. DC.).

FEDERAL DISTRICT: Hacienda Panarigua, near sea-level, at the entrance of the valley of Puerto La Cruz; flowers Feb. 11, 1921 (*Pittier* 9200).

Identified at first as the typical *C. scandens* Vahl, but a subsequent, more careful examination showed that our plant agreed better with the description of the var. *terminale* of Dunal, which is so different from the type in the shape and size of the leaves, the arrangement and dimensions of the flowers, etc., that we think it is preferable to consider it as a distinct species.

CESTRUM TENUIFLORUM H.B.K. Nov. Gen. & Sp. 3: 61. 1818.

Type collected on the slopes of Mount Duida, near Esmeralda in the upper Orinoco Valley, by Humboldt and Bonpland. O. E. Schulz considers it as a mere variety of *C. latifolium* Lam.

CESTRUM LAXIFLORUM Dunal in DC. Prodr. 13¹: 665. 1852.

Cited by Dunal as proceeding from Colombia, this species, the type (*Moritz* 212) of which is in the DeCandolle Herbarium, is most probably from the Venezuelan Andes, since the collector's explorations west of Caracas do not seem to have gone beyond the States of Mérida and Trujillo.

CESTRUM MORITZI Dunal in DC. Prodr. 13¹: 619. 1852. (Descr. emend.)

Arbuscula ramosa, ramis virgatis lanuginoso-tomentosis, foliis magnis, pseudo-stipulatis, membranaceis, petiolo tereto, sulcato, lanuginoso, laminis ovalibus, basi acutis apice breviter acuminatis, acutis obtusisve, supra saturate virididis costa venisque primariis circa 12 plus minusve lanuginosis demum glabratis, subtus pallidioribus costa venisque lanuginosis, demum pilis furcatis stellulatisque plus minusve conspersis, marginibus minute revo-

lutis; pseudo-stipulis foliaceis, parvis; racemis axillaribus, sessilibus pedunculatisve, petiolis duplo-quintuplove longioribus rhachi lanuginoso; floribus sessilibus, glomeratis, congestis, stipulis parvis obovato-linearibus caducis suffultis; calyce poculiformi, striato, stellulato-lanuginoso, dentibus parvis acutis inaequalibus; corolla albida, tubo infundibuliformi, striato, glabro, in sicco sordide flavescente, lobulis ovalibus, apice subobtusis, in sicco fusco-badiis, marginibus introflexis tomentosinusculis; filamentis usque ad medium tubo adnatis, parte libera supra basin geniculato-tumida, basi plus minusve villosula; antheris ovato-rotundatis minutissime puberulis; ovario obovoideo, glabro; stylo glabro, filiforme; stigmatate discoideo.

Arbuscula circa 1 m. alta. Petioli 1.2-1.5 cm. longi; laminae 11.5-22 cm. longae, 3-10 cm. latae. Pseudo-stipulae 1-1.5 cm. longae. Racemi 3-6.5 cm. longi. Flores 13-15 mm. longi. Bracteolae 1-3.5 mm. longae. Calyx 3.5-5.5 mm. longus. Corolla 10.6-14.8 mm. longa, lobulis 1.6-2.5 mm. longis. Filamentorum pars libera 4.5-5 mm. longa. Pistillum 13 mm. longum.

TRUJILLO: Mendoza, 1225 m., in shady places of the river flats and in coffee plantations; flowers January 19, 1928 (*Pittier* 12639). The type (*Moritz* 309) is wrongly given as from Colombia.

Notwithstanding the much larger leaves and a few other rather slight discrepancies in the description, our specimens evidently correspond to Dunal's species under the above name. It is not a species of the higher regions, but is to be looked for in the tierra templada. In Mendoza it is known vernacularly as *guacharaquito*. Its racemose inflorescences are striking and characteristic.

CESTRUM NOCTURNUM L. Sp. Pl. 1: 191. 1753.

FEDERAL DISTRICT: Coromoto, 900-1000 m., valley of Camurí Grande on the coast east of La Guaira, in garden; flowers November 8, 1926 (*Pittier* 13029)—ESTADO ARAGUA: La Trinidad de Maracay, 440 m., in bushes; flowers February 2, 1913 (*Pittier* 5797).

No. 13029 is our latest acquisition in the genus and it agrees fairly well with Dunal's description, though less with O. E. Schulz's, with one exception, which may distinguish it as a special type. The teeth are borne on the adnate part of the filament and not on the free part. Several flowers have been examined and all show the same very large and obtuse teeth, inserted below the emergence of the filaments. At first, I felt inclined to separate this shrub as a distinct species and had even given it a name suggested by the relatively large size of the teeth. But, on second thought, the name *nocturnum* was preserved, until the necessary comparison of specimens can be made. The plant behaves exactly as described for *C. nocturnum*. When I collected my specimens, the corollas were odorless and closed tight as if still immature, but when I put them in the press at dusk, they were broadly open and emitted a strong, sweet scent.

Specimens of our no. 5797 we have not at hand and its identification, which, until verified, should be considered doubtful, was made at Washington, perhaps by myself.

Cestrum bigibbosum Pittier, sp. nov.

Arbor parva, ramis ramulisque flexuosis, cortice griseo laevi tectis; foliis magnis, membranaceis, petiolatis, glaberrimis, exstipulatis, petiolo canaliculato, laminis elliptico-lanceolatis, basi acutis in petiolo decurrentibus, apice acuminatis tenuiter cuspidatis, supra laete viridis minutissime reticulatis, costa venisque primariis circa 12 impressis, venulis vix prominulis, subtus pallidioribus costa venisque prominentibus; inflorescentia terminali, bracteosa, depauperata, persistenti rhachi parce puberulo; bracteae lanceolatae, acuminatae, glabrae; floribus breve pedicellatis bracteolatis; bracteolis lineari-subulatis, pedicellisque puberulis; calyce tubuloso-infundibuliformi, plus minusve irregulariter 4-5-dentato, extus glabrato, dentibus parvis, obtusiusculis, apice puberulis; sinus latis; corolla alba, tubo glabro basi tenui apice sensim ampliato, lobulis ovalibus oblongisve apice obtusis, marginibus anguste introflexis, dense puberulis; staminibus usque ad $\frac{3}{4}$ tubo adnatis, filamentis glabris basi bigibbosis, antheris ovalibus, puberulis; pistillo glabro; stigmate capitato.

Arbor 2-4 m. alta. Petioli 1.6-2 cm. longi; laminae 15-28 cm. longae, 4-9 cm. latae. Bracteae 1-2.5 cm., bracteolae 1-3 mm. longae. Pedicelli circa 1 mm. longi. Flores circa 2 mm. longi. Calyx 5 mm. longus. Corollae tubus 1.5 mm. longus; lobuli 4-4.5 mm. longi. Filamenta 3 mm. longa. Pistillum 11 mm. longum.

FEDERAL DISTRICT: Between Aguacatal and Alto del Cogollal, 1500 m., valley of Puerto La Cruz, in dense forests; flowers February 18, 1921 (*Pittier* 9245, type).

Cestrum bigibbosum, which I have not been able to match with any other described species, is distinguished by its very large leaves, and its long-adnate filaments provided near the base of the free part with two well formed protuberances.

Cestrum amplum Pittier, sp. nov.

Arbuscula ramis crassis, erectis, atro-violaceis, glaberrimis, foliosis; foliis coriaceis petiolatis, plus minusve complicatis, glaberrimis, petiolo canaliculato, rugoso, in sicco nigrescente, laminis ovato-lanceolatis, basi cuneatis apice acutis subcuspidatisve, supra lucidis, costa impressa venis primariis 10-11 venulisque prominulis, subtus pallidioribus costa venisque primariis valde prominentibus venulis reticulatis prominulis, marginibus revolutis; stipulis foliaceis, parvis; inflorescentia paniculata, ampla, spicis axillaribus defoliatis densifloris, laxis, foliis subaequantibus; floribus pedicellatis subsessilibusve, pedicellis suberassis calyce brevioribus apice bracteolatis; bracteis plus minusve foliaceis plerumque lineari-ellipticis, quam calyce saepe longioribus, nervo medio conspicuo; bracteolis lineari-filiformibus, brevibus; calyce tubuloso-poculiformi, tubo glabro plus minusve striato, dentibus irregularibus, plerumque angustis, duobus saepe ad medium adnatis, apice acutis, puberulis; corolla e basi angusta sensim dilatata, violacea, tubo glabro, lobulis ovatis ovato-ellipticisve, acutis, extus glabris, intus marginibusque introflexis fulvo-tomentellis; staminibus usque ad medium tubo adnatis, glabris, filamentis basi gibbosis, leviter incrassatis; antheris suborbicularibus; ovario subovoideo, stylo elongato filiformi, stigma discoideo minutissime puberulo.

Arbuscula supra metralis. Petioli 0.6-1 cm. longi; laminae 9-11 cm. longae, 2.5-3.7 cm. latae. Stipulae 1.5-2.5 cm. longae. Panicula usque ad 30 cm. longa, basi 20 cm. lata; spicae 10 cm. longae vel breviores. Pedicelli